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Eran Steinberg

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EXAMINER

CARTER, AARON W

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/763,801	Applicant(s) STEINBERG ET AL.	
	Examiner AARON W. CARTER	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-167 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-167 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/04, 10/04, 7/07, 11/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 10 and 122 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 is identical to claim 8. Claim 122 is identical to claim 120.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the

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computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 1-127 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 1 and 67 define a “system”. However, while the preamble defines a “system”, which would typically be indicative of an “apparatus”, the body of the claim lacks definite structure indicative of a physical apparatus. The claims as a whole appears to be nothing more than a “system” of software elements, thus defining functional descriptive material per se.

Functional descriptive material may be statutory if it resides on a “computer-readable medium or computer-readable memory”. The claim(s) indicated above lack structure, and do not define a computer readable medium and are thus non-statutory for that reason (i.e., “When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized” – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests:

1. Amending the claim(s) to embody the program on “computer-readable medium” or equivalent; assuming the specification does NOT define the computer readable medium as a “signal”, “carrier wave”, or “transmission medium” which are deemed non-statutory; or
2. Adding structure to the body of the claim that would clearly define a statutory apparatus.

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Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-167 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the new faceprint" in lines 14 and 15. There is insufficient antecedent basis for this limitation in the claim.

Claim 67 recites the limitation "the new faceprint" in lines 10, 12 and 15. There is insufficient antecedent basis for this limitation in the claim.

Claim 67 recites the limitation "the normalized face regions" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 67 recites the limitation "the normalized face region" in line 12. There is insufficient antecedent basis for this limitation in the claim.

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Claim 128 recites the limitation "the new faceprint" in lines 9, 11 and 14. There is insufficient antecedent basis for this limitation in the claim.

Claims 2-66, 68-127 and 129-167 are rejected by the virtue of their dependency upon independent claims 1, 67 and 128, but they also contain numerous instances of the limitation "the new faceprint", which all appear to lack antecedent basis.

Regarding claims 67 and 128, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 7 recites the limitation "the pose normalizing" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 26 recites the limitation "the first faceprint" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 143 recites the limitation "the detection of face candidate regions" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 159 recites the limitation "the new face class" in line 2. There is insufficient antecedent basis for this limitation in the claim.

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Claim 160 recites the limitation "the new face class" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 14-21, 25, 28, 40-43, 52-54, 56, 57, 66-74, 78, 81, 93-96, 104, 105, 114-118, 126, 128-133, 137, 140, 142, 144-150, 159-164 and 167 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2003/0198368 to Kee.

As to claim 1, Kee discloses a processor-based system operating according to digitally-embedded programming instructions and communicating with one or more digital data storage media for classifying and archiving images including face regions that are acquired with a digital image acquisition device (*Fig. 3 and paragraphs 33 and 71*), the programming instructions comprising:

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(a) a face detection module for identifying a group of pixels corresponding to a face region within digital image data acquired by the acquisition device (*Fig. 3, element 320 and paragraphs 33 and 37*);

(b) a normalization module for generating a normalized face region from said face region (*Fig. 3, element 340 and paragraphs 39 and 46*);

(c) a face recognition module for automatically extracting a set of values of face classifier parameters from said normalized face region, said set of face classifier parameter values being collectively known as a faceprint associated with said normalized face region (*Fig. 3, element 350 and paragraph 47, wherein feature values corresponds to a faceprint*);

(d) a workflow module for automatically comparing said extracted faceprint to a database of archived faceprints previously determined to correspond to one or more known identities, and for determining based on the comparing whether the new faceprint corresponds to any of the one or more known identities (*Fig. 3, element 370 and paragraphs 52 and 53*), the workflow module further for associating the new faceprint and normalized face region from which said faceprint is derived with a new or known identity within a database comprising other data corresponding to the archived faceprints and associated parent images for performing further comparisons with further faceprints (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*); and

(e) a database module for archiving the data according to the associating by the workflow module within one or more digital data storage media (*Fig. 3, element 380 and paragraphs 49 and 58*).

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As to claim 2, Kee discloses the system of claim 1, wherein the face detection module automatically identifies the group of pixels corresponding to the face region when the digital image is received (*Fig. 3, element 320 and paragraphs 33 and 37*).

As to claim 3, Kee discloses system of claim 1, wherein the detected face regions are automatically processed for normalization when they are identified (*Fig. 3, element 340 and paragraphs 39 and 46*).

As to claim 4, Kee discloses the system of claim 3, wherein the face detection module automatically identifies the group of pixels corresponding to the face region when the digital image is received (*Fig. 3, element 320 and paragraphs 33 and 37*).

As to claim 5, Kee discloses the system of claim 1, wherein the identifying by the face detection module comprises determining a probability that the group of pixels comprises a face region (*paragraph 37*).

As to claim 6, Kee discloses the system of claim 5, wherein the identifying further comprises determining whether the probability lies above a predetermined threshold, and if not,

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automatically determining that the group of pixels does not comprise a face region (*paragraph 37*).

As to claim 14, Kee discloses the system of claim 1, wherein the workflow module for determining that the new faceprint corresponds to a first identity, and the database module for archiving the new faceprint within a first face class, and wherein the face recognition module is further for comparing values of face classifier parameters of a second face class including a second faceprint image to values of the parameters corresponding to the first face class including the new faceprint, as well as to further face classes including further faceprints, and for determining based on the comparing whether the second faceprint matches any of the first and further face classes (*Fig. 3, element 370 and paragraph 52 and 53*).

As to claim 15, Kee discloses the system of claim 1, wherein one or more archived faceprints have been previously determined to correspond to the one or more known identities, and the comparing by the workflow module comprises determining proximities of the values of the face classifier parameters of the new faceprint image with values corresponding to the one or more archived faceprints (*Fig. 3, element 370 and paragraph 52 and 53*).

As to claim 16, Kee discloses the system of claim 15, wherein the proximities of the values correspond to proximities of locations in the multi-dimensional mathematical space defined by the set of face classifier parameters which correspond to a faceprint (*Fig. 3, element 370 and paragraph 52 and 53*).

As to claim 17, Kee discloses the system of claim 16, wherein at least one proximity is statistically calculated based on comparisons with multiple archived faceprints corresponding to a same identity (*Fig. 3, element 370 and paragraph 52, 53 and 69*).

As to claim 18, Kee discloses the system of claim 15, wherein the proximities of the values correspond to at least one of proximities of color, shape, or relative distances between identified locations within the faceprint images (*Fig. 3, element 370 and paragraphs 47, 52 and 53*).

As to claim 19, Kee discloses the system of claim 15, wherein at least one proximity is statistically calculated based on comparisons with multiple archived faceprints corresponding to a same identity (*Fig. 3, element 370 and paragraph 52, 53 and 69*).

As to claim 20, Kee discloses the system of claim 15, wherein the determining by the face recognition module comprises automatically determining that the new faceprint corresponds to a known identity based on one or more geometric distance proximities being within a predetermined proximity threshold (*Fig. 3, element 370 and paragraphs 47, 52 and 53*).

As to claim 21, Kee discloses the system of claim 20, wherein at least one proximity is statistically calculated to be within the threshold when the probability that the proximity is within

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the threshold is above a predetermined probability value (*Fig. 3, element 370 and paragraphs 52 and 53*).

As to claim 25, Kee discloses the system of claim 15, wherein the determining by the workflow module comprises automatically determining that the new faceprint corresponds to a known identity when comparisons of the face classifier parameter values of the first face print with multiple archived faceprints corresponding to a same known identity each result in a determination of an identity match (*Fig. 3, element 370 and paragraph 52, 53 and 69*).

As to claim 28, Kee discloses the system of claim 1, wherein the associating by the workflow module comprises grouping the new faceprint with a new or prior face class defined by values of one or more face classifier parameters (*Fig. 3, element 370 and paragraph 58*).

As to claim 40, Kee discloses the system of claim 28, wherein the archiving of the new data corresponding to the face classifier parameters of the new faceprint comprises grouping the new faceprint within a previously-determined face class defined by sets of boundary face classifier parameter values including particular face classifier parameter values of the new faceprint (*Fig. 3, element 370 and paragraph 58*).

As to claim 41, Kee discloses the system of claim 40, wherein the archiving further comprises re-defining the boundaries of the previously-determined face class based on one or

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more particular face classifier parameter values of the new faceprint being outside previously established boundary values (*Fig. 3, element 370 and paragraph 58*).

As to claim 42, Kee discloses the system of claim 40, wherein the face class has been previously grouped with one or more other face classes within a same identity table corresponding to a same known identity, and wherein the archiving further comprises adjusting boundary values of the identity table based on adjusted boundary values of the face class including the new faceprint (*Fig. 3, element 370 and paragraph 58*).

As to claim 43, Kee discloses the system of claim 1, wherein the programming instructions further comprise an image detection module for determining that a new image is presented for face detection processing (*Fig. 3, element 310 and paragraph 36*).

As to claim 52, Kee discloses the system of claim 1, wherein the identifying by the face detection module applies automatic face region identification when a detection probability is calculated to be above a detection probability threshold (*Fig. 3, element 320 and paragraphs 33 and 37*) or the comparing by the face recognition module applies automatic identity recognition when a matching probability with a prior faceprint is calculated to be above a matching probability threshold, or both (*Fig. 3, element 370 and paragraphs 52 and 53*).

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As to claim 53, Kee discloses the system of claim 52, wherein the detection probability threshold or the matching probability threshold, or both, are adjustable (*paragraph 58*).

As to claim 54, Kee discloses the system of claim 53, wherein the detection threshold or the matching threshold, or both, are adjustable by a user, a manufacturer, or an adaptive learning program of the system, or combinations thereof (*paragraph 58*).

As to claim 56, Kee discloses the system of claim 1, wherein the set of face classifier parameters are principle component vectors derived from a set of eigenface descriptors (*paragraph 47*).

As to claim 57, Kee discloses the system of claim 1, wherein the set of face classifier parameters are independent component vectors derived from an independent component analysis of a normalized face image (*paragraph 47*).

As to claim 66, Kee discloses the system of claim 1, wherein the archiving further for enabling further comparisons with further faceprints and for recalling the faceprints and their associated normalized face regions and parent images (*paragraph 58*).

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As to claim 67, please refer to the rejection of claim 1 above.

As to claim 68, please refer to the rejection of claim 15 above.

As to claim 69, please refer to the rejection of claim 16 above.

As to claim 70, please refer to the rejection of claim 17 above.

As to claim 71, please refer to the rejection of claim 18 above.

As to claim 72, please refer to the rejection of claim 19 above.

As to claim 73, please refer to the rejection of claim 20 above.

As to claim 74, please refer to the rejection of claim 21 above.

As to claim 78, please refer to the rejection of claim 25 above.

As to claim 81, please refer to the rejection of claim 28 above.

As to claim 93, please refer to the rejection of claim 40 above.

As to claim 94, please refer to the rejection of claim 41 above.

As to claim 95, please refer to the rejection of claim 42 above.

As to claim 96, please refer to the rejection of claim 43 above.

As to claim 104, please refer to the rejection of claim 56 above.

As to claim 105, please refer to the rejection of claim 57 above.

As to claim 114, please refer to the rejection of claim 66 above.

As to claim 115, please refer to the rejection of claim 2 above.

As to claim 116, please refer to the rejection of claim 3 above.

As to claim 117, please refer to the rejection of claim 4 above.

As to claim 118, please refer to the rejection of claim 1 above.

As to claim 126, please refer to the rejection of claim 66 above.

As to claim 128, please refer to the rejection of claim 1 above.

As to claim 129, please refer to the rejection of claim 15 above.

As to claim 130, please refer to the rejection of claim 16 above.

As to claim 131, please refer to the rejection of claim 17 above.

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As to claim 132, please refer to the rejection of claim 20 above.

As to claim 133, please refer to the rejection of claim 21 above.

As to claim 137, please refer to the rejection of claim 25 above.

As to claim 140, please refer to the rejection of claim 28 above.

As to claim 142, please refer to the rejection of claim 43 above.

As to claim 144, please refer to the rejection of claim 66 above.

As to claim 145, Kee discloses the method of claim 128, further comprising verifying that the face region is similar enough to a face region of one or more known identities to be correctly recognized (*Fig. 3, element 370 and paragraphs 52 and 53*).

As to claim 146, Kee discloses the method of claim 145, further comprising completing the recognition process by determining which of said known identities said face region should be associated with (*Fig. 3, element 370 and paragraphs 52 and 53*).

As to claim 147, Kee discloses the method of claim 128, wherein the generating further comprises performing one or more additional normalizing operations (*paragraph 46*).

As to claim 148, Kee discloses the method of claim 147, wherein the performing comprises luminance, size, or orientation normalizing, or combinations thereof (*paragraph 46*).

As to claim 149, Kee discloses the method of claim 128, wherein the generating further comprises size normalizing of said face region (*paragraph 46*).

As to claim 150, Kee discloses the method of claim 128, further comprising archiving the new faceprint and its associated parent image, according to the associating, within one or more digital data storage media (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 159, Kee discloses the method of claim 150, wherein the archiving further comprises adjusting boundary face classifier parameter values of the identity based on parameters of the new face class (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 160, Kee discloses the method of claim 159, wherein the archiving further comprises adjusting boundary face classifier parameter values of a different identity based on parameters of the adjusted boundary values of the identity including the new face class (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 161, Kee discloses the method of claim 150, wherein the archiving of the new data corresponding to the face classifier parameters of the new faceprint comprises grouping

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the new faceprint within a previously-determined face class defined by sets of boundary face classifier parameter values including particular face classifier parameter values of the new faceprint (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 162, Kee discloses the method of claim 161, wherein the archiving further comprises re-defining the boundaries of the previously-determined face class based on one or more particular face classifier parameter values of the new faceprint being outside previously established boundary values (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 163, Kee discloses the method of claim 161, wherein the face class has been previously grouped with one or more other face classes within a same identity table corresponding to a same known identity, and wherein the archiving further comprises adjusting boundary values of the identity table based on adjusted boundary values of the face class including the new faceprint (*Fig. 3, elements 360 and 370 and paragraph 18, 49 and 58*).

As to claim 164, please refer to the rejection of claim 66 above.

As to claim 167, please refer to the rejection of claim 66 above.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7-13, 119-125, 165 and 166 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kee (already of record) in view of the article “3D Pose Estimation and Normalization for Face Recognition by Jebara (already of record).

As to claim 7, Kee discloses the system of claim 1.

Kee does not disclose expressly wherein the pose normalization comprises:

- (i) determining the pose of the confirmed face region;
- (ii) mapping said face region onto a 3d average-face model to create an interim 3d model of said face region;
- (iii) rotating said interim 3d model into full frontal alignment; and
- (iv) translating the facial aspect of said interim 3d model back onto 2d image space to create a pose normalized face region.

However, Jebara discloses a system for face region normalization comprising:

- (i) determining the pose of the confirmed face region (*page 61, lines 17-23*);
- (ii) mapping said face region onto a 3d average-face model to create an interim 3d model of said face region (*pages 67-74, section 3*);

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(iii) rotating said interim 3d model into full frontal alignment (*page 74-76, section 4*);
and

(iv) translating the facial aspect of said interim 3d model back onto 2d image space to create a pose normalized face region (*page 74-76, section 4*).

Kee & Jebara are combinable because they are from the same art of facial image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the pose normalization process, as taught by Jebara, with the system disclosed by Kee.

The suggestion/motivation for doing so would have been to provide a vision system which would permit automatic machine-based face detection and recognition in uncontrolled environments (*Jebara, page 1, lines 11-12*).

Therefore, it would have been obvious to combine Kee with Jebara to obtain the invention as specified in claim 7.

As to claim 8, the combination of Kee and Jebara discloses the system of claim 7, wherein the determining of the pose of a confirmed face region further comprises:

(i) determining locations of principle facial feature within said face region (*Jebara, page 61, lines 14-15*);

(ii) determining at least two geometric relationships between said facial features (*Jebara, page 61, lines 15-17*);

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(iii) extrapolating from said geometric relationships the plane of the facial region, relative to the normal plane of the image acquisition apparatus thereby determining the facial pose relative to the normal plane of the image acquisition apparatus (*Jebara, page 61, lines 17-18*).

As to claim 9, the combination of Kee and Jebara discloses the system of claim 8, wherein said principle facial features comprise at least two of eye-pair, nose and mouth regions (*Jebara, page 61, lines 14-15*).

As to claim 10 please refer to the rejection of claim 8 above.

As to claim 11, the combination of Kee and Jebara discloses the system of claim 7, wherein said mapping of said face region onto a 3d average-face model comprises an additional rescaling of said 3d average face model along at least one horizontal dimension, said additional rescaling being based on the at least two geometric relationships determined in the pose determining (*Jebara, pages 67-74, section 3*).

As to claim 12, the combination of Kee and Jebara discloses the system of claim 7, wherein the normalizing further comprises performing one or more additional normalizing operations on said pose normalized face region (*Kee, paragraph 46 and Jebara, page 76, section 5*).

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As to claim 13, the combination of Kee and Jebara discloses the system of claim 12, wherein the one or more additional normalization operations comprise luminance, size, or orientation normalization, or combinations thereof (*Kee, paragraph 46 and Jebara, page 76, section 5*).

As to claim 119, please refer to the rejection of claim 7 above.

As to claim 120, please refer to the rejection of claim 8 above.

As to claim 121, please refer to the rejection of claim 9 above.

As to claim 122, please refer to the rejection of claim 8 above.

As to claim 123, please refer to the rejection of claim 11 above.

As to claim 124, please refer to the rejection of claim 12 above.

As to claim 125, please refer to the rejection of claim 13 above.

As to claim 165, please refer to the rejection of claim 7 above.

As to claim 166, please refer to the rejection of claim 7 above.

7. Claim 27, 29-39, 44, 45, 50, 51, 80, 82-92, 97, 98, 127, 139, 141 and 151-158 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kee (already of record) in view of US 2002/0132663 to Cumbers.

As to claim 27, Kee discloses the system of claim 15.

Kee does not disclose expressly wherein the determining by the workflow module comprises requesting user confirmation whether the new faceprint image corresponds to one or

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more known identities when comparison of the face classifier parameter values of the new faceprint with multiple archived faceprints corresponds to multiple known identities result in determination of identity matches with at least two different identities.

However, Cumbers discloses a facial recognition system comprising requesting user confirmation whether the new faceprint image corresponds to one or more known identities when comparison of the face classifier parameter values of the new faceprint with multiple archived faceprints corresponds to multiple known identities result in determination of identity matches with at least two different identities (*paragraph 47*).

Kee & Cumbers are combinable because they are from the same art of facial image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the system of requesting user confirmation, as taught by Cumbers, with the system disclosed by Kee.

The suggestion/motivation for doing so would have been to resolve conflict and errors encountered by the biometric system (*Cumbers, paragraph 7*).

Therefore, it would have been obvious to combine Kee with Cumbers to obtain the invention as specified in claim 27.

As to claim 29, Kee discloses the system of claim 28.

Kee does not disclose expressly wherein when the determining by the workflow module results in no identity matches between the new faceprint and any known identity, the workflow module determines that the new faceprint image corresponds to a new identity and is grouped

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with a new face class defined by sets of boundary face classifier parameter values, and archives new data accordingly.

However, Cumbers discloses a facial recognition system that when a determination results in no identity matches between the new faceprint and any known identity, the workflow module determines that the new faceprint image corresponds to a new identity and is grouped with a new face class defined by sets of boundary face classifier parameter values, and archives new data accordingly (*paragraph 50, wherein a doe file is created for new identities*).

Kee & Cumbers are combinable because they are from the same art of facial image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the system of handling no identity matches, as taught by Cumbers, with the system disclosed by Kee.

The suggestion/motivation for doing so would have been to track anonymous persons (*Cumbers, paragraph 7*).

Therefore, it would have been obvious to combine Kee with Cumbers to obtain the invention as specified in claim 29.

As to claim 30, the combination of Kee and Cumbers discloses the system of claim 29, wherein the archiving of the new data corresponding to the face classifier parameters of the new faceprint corresponding to the new identity comprises associating the new data with archived data corresponding to one or more known identities based on a relationship between the new identity and the one or more known identities (*Cumbers, paragraph 50*).

As to claim 31, the combination of Kee and Cumbers discloses the system of claim 29, wherein the archiving of the new data corresponding to the face classifier parameters of the new faceprint corresponding to the new identity comprises associating the new data with a further new identity based on a relationship between the two new identities (*Cumbers, paragraph 50*).

As to claim 32, the combination of Kee and Cumbers discloses the system of claim 31, wherein the archiving of the new data corresponding to the face classifier parameters of the new faceprint comprises generating a new face class defined by sets of boundary face classifier parameter values including the particular face parameter values of the new face print image (*Cumbers, paragraph 50*).

As to claim 33, the combination of Kee and Cumbers discloses the system of claim 29, wherein the archiving further comprises grouping the new face class with another face class within a same identity table corresponding to a same appearance of a known identity (*Cumbers, paragraph 50*).

As to claim 34, the combination of Kee and Cumbers discloses the system of claim 33, wherein the archiving further comprises adjusting boundary face classifier parameter values of a

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different identity based on adjusted boundary values of the identity including the new face class (*Cumbers, paragraph 50*).

As to claim 35, the combination of Kee and Cumbers discloses the system of claim 29, wherein the archiving further comprises grouping the new face class within a first identity table, and grouping the first identity table with a second identity table, including a second face class, together within a same appearance table corresponding to a different appearances of a same known identity (*Cumbers, paragraph 50*).

As to claim 36, the combination of Kee and Cumbers discloses the system of claim 35, wherein the archiving further comprises adjusting boundary face classifier parameter values of a different identity based on new or adjusted boundary values of the identity including the new face class (*Cumbers, paragraph 50*).

As to claim 37, the combination of Kee and Cumbers discloses the system of claim 29, wherein the archiving further comprises grouping the new face class within a previously generated identity table including multiple face classes corresponding to multiple different values of face classifier parameters corresponding to a same appearance of a same identity (*Cumbers, paragraph 50*).

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As to claim 38, the combination of Kee and Cumbers discloses the system of claim 37, wherein the archiving further comprises adjusting boundary face classifier parameter values of the identity based on parameters of the new face class (*Cumbers, paragraph 50*).

As to claim 39, the combination of Kee and Cumbers discloses the system of claim 38, wherein the archiving further comprises adjusting boundary face classifier parameter values of a different identity based on parameters of the adjusted boundary values of the identity including the new face class (*Cumbers, paragraph 50*).

As to claim 44, the combination of Kee and Cumbers discloses the system of claim 1, wherein the programming instructions further comprises a set of user interface modules for obtaining user input in the detection of face candidate regions, or the classifying, archiving or recalling of faceprints or associated normalized face regions, or combinations thereof (*Cumbers, paragraph 47*).

As to claim 45, the combination of Kee and Cumbers discloses the system of claim 1, wherein the programming instructions are stored on or accessible by a stand alone processor-based device configured for receiving raw image data from a digital camera (*Kee, Fig. 3*), and the device being coupled with or including user interface hardware, and upon which the classifying is performed (*Cumbers, paragraph 47*).

As to claim 50, the combination of Kee and Cumbers discloses the system of claim 1, wherein the identifying by the face detection module or the comparing by the face recognition module, or both, comprises receiving and utilizing user input (*Cumbers, paragraph 47*).

As to claim 51, the combination of Kee and Cumbers discloses the system of claim 1, wherein the identifying by the face detection module or the comparing by the face recognition module, or both, are configured for auto-processing subject to selective disablement of the auto-processing by a user (*Cumbers, paragraph 47*).

As to claim 80, please refer to the rejection of claim 27 above.

As to claims 82-92, please refer to the rejections of claims 29-39 above.

As to claim 97, please refer to the rejection of claim 44 above.

As to claim 98, please refer to the rejection of claim 45 above.

As to claim 127, please refer to the rejection of claim 44 above.

As to claim 139, please refer to the rejection of claim 27 above.

As to claims 141, please refer to the rejections of claims 29 above.

As to claims 151-158, please refer to the rejections of claims 30-37 above.

8. Claims 46-49, 55 and 99-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kee in view of US 2002/0141586 to Margalit et al. ("Margalit").

As to claim 46, Kee discloses system of claim 1.

Kee does not disclose expressly wherein the programming instructions are stored at least in part on an embedded appliance for performing some image classifying-related processing prior to outputting processed image data to a further processor-based device upon with classifying is further performed.

Margalit discloses a facial recognition system comprising programming instructions are stored at least in part on an embedded appliance for performing some image classifying-related processing prior to outputting processed image data to a further processor-based device upon which classifying is further performed (*Figs. 10C and 13C and paragraphs 53, 59 and 157*).

Kee & Margalit are combinable because they are from the same art of image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine an embedded appliance for performing some image classifying-related processing to output processed image data to a further processor-based device upon which classifying is further performed, as taught by Margalit, with the system disclosed by Kee.

The suggestion/motivation for doing so would have been to provide a portable device capable of communicating with an authenticator for authentication of identity (*Margalit, Abstract and paragraph 16*).

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Therefore, it would have been obvious to combine Kee with Margalit to obtain the invention as specified in claim 46.

As to claim 47, the combination of Kee and Margalit discloses the system of claim 46, wherein the embedded appliance comprises a digital camera (*Margalit, Figs. 10C and 13C and paragraphs 53, 59 and 157*).

As to claim 48, the combination of Kee and Margalit discloses the system of claim 47, wherein the digital camera comprises a dedicated digital camera or a camera-capable handheld pda or phone, or a combination thereof (*Margalit, Figs. 10C and 13C and paragraphs 53, 59 and 157*).

As to claim 49, the combination of Kee and Margalit discloses the system of claim 1, wherein the programming instructions are stored at least in part on a processor-based device connected to a network for performing some image classifying-related processing on the device prior to outputting processed data to a back-end server upon which the classifying is further performed (*Margalit, Figs. 10C and 13C and paragraphs 53, 59 and 157*).

As to claim 55, the combination of Kee and Margalit discloses the system of claim 1, wherein the programming instructions are stored on or accessible by processor-based components within a digital camera upon which the classifying is performed (*Margalit, Figs. 10C and 13C and paragraphs 53, 59 and 157*).

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As to claim 99, please refer to the rejection of claim 46 above.

As to claim 100, please refer to the rejection of claim 47 above.

As to claim 101, please refer to the rejection of claim 48 above.

As to claim 102, please refer to the rejection of claim 49 above.

As to claim 103, please refer to the rejection of claim 55 above.

9. Claims 58-61 and 106-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kee (already of record).

As to claim 58, Kee discloses the system of claim 1, wherein the set of face classifier parameters are derived from a mathematical transform of the normalized face region (*paragraph 47*).

Kee does not disclose expressly wherein the set of face classifier parameters are fourier components derived from a 2d fourier transform of the normalized face region.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to derive a set of face classifier parameters comprising fourier components from a 2d fourier transform, since this practice is well known in the art of facial image processing.

Therefore, the Examiner takes Official Notice that it would have been obvious to combine the

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process of deriving a set of face classifier parameters comprising fourier components from a 2d fourier transform to the system disclosed by Kee to obtain the invention as specified in claim 58.

As to claim 59, Kee discloses the system of claim 1, wherein the set of face classifier parameters are derived from a mathematical transform of the normalized face region (*paragraph 47*).

Kee does not disclose expressly wherein the set of face classifier parameters are fourier transform vectors derived from a 2d discrete cosine transform of the normalized face region.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to derive a set of face classifier parameters comprising fourier transform vectors from a 2d discrete cosine transform, since this practice is well known in the art of facial image processing. Therefore, the Examiner takes Official Notice that it would have been obvious to combine the process of deriving a set of face classifier parameters comprising fourier transform vectors from a 2d discrete cosine transform to the system disclosed by Kee to obtain the invention as specified in claim 59.

As to claim 60, Kee discloses the system of claim 1, wherein the set of face classifier parameters are derived from a mathematical transform of the normalized face region (*paragraph 47*).

Kee does not disclose expressly wherein the set of face classifier parameters are wavelet transform components derived from a 2d wavelet transform of the normalized face region.

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At the time of the invention, it would have been obvious to a person of ordinary skill in the art to derive a set of face classifier parameters comprising wavelet transform components from a 2d wavelet transform, since this practice is well known in the art of facial image processing. Therefore, the Examiner takes Official Notice that it would have been obvious to combine the process of deriving a set of face classifier parameters comprising wavelet transform components from a 2d wavelet transform to the system disclosed by Kee to obtain the invention as specified in claim 60.

As to claim 61, Kee discloses the system of claim 1, wherein the set of face classifier parameters are derived from a mathematical transform of the normalized face region (*paragraph 47*).

Kee does not disclose expressly wherein the set of face classifier parameters are gabor transform components derived from a 2d gabor transform of the normalized face region.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to derive a set of face classifier parameters comprising gabor transform components from a 2d gabor transform, since this practice is well known in the art of facial image processing. Therefore, the Examiner takes Official Notice that it would have been obvious to combine the process of deriving a set of face classifier parameters comprising gabor transform components from a 2d gabor transform to the system disclosed by Kee to obtain the invention as specified in claim 61.

As to claims 106-109, please refer to the rejection of claims 58-61 above.

10. Claims 62, 63, 110 and 111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kee in view of US 2003/0086593 to Liu et al. ("Liu").

As to claim 62, Kee discloses the system of claim 1, wherein the set of face classifier parameters are derived from a mathematical transform of the normalized face region (*paragraph 47*).

Kee does not disclose expressly wherein the set of face classifier parameters comprises a combination of two or more of principle components vectors, independent component vectors, fourier components, discrete cosine transform components, wavelet transform components and gabor transform components.

However, Liu discloses a set of face classifier parameters comprises a combination of two or more of principle components vectors, independent component vectors, fourier components, discrete cosine transform components, wavelet transform components and gabor transform components (*Abstract and paragraph 37*).

Kee & Liu are combinable because they are from the same art of facial image processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a combination of gabor and wavelet transform components to represent the face classifier parameters, as taught by Liu, with the system disclosed by Kee.

The suggestion/motivation for doing so would have been because gabor wavelets exhibit strong characteristics of spatial locality and orientation selectivity, and are optimally localized in the space and frequency domains.

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Therefore, it would have been obvious to combine Kee with Liu to obtain the invention as specified in claim 62.

As to claim 63, the combination of Kee and Liu discloses the system of claim 62, wherein the set of face classifier parameters includes additional classifiers or subsets thereof which further characterize the shape, texture, color distribution or localized physical features of the face region (*Kee, paragraph 47*).

As to claims 110 and 111, please refer to the rejection of claim 62 and 63 above.

11. Claim 143 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kee in view of US 2006/0228040 to Simon et al. ("Simon").

As to claim 143, Kee discloses method of claim 128.

Kee does not disclose expressly further comprising obtaining user input in the detection of face candidate regions.

However, Simon discloses obtaining user input in the detection of face candidate regions (*Fig. 2A, element 225*).

Kee & Simon are combinable because they are from the same art of facial image processing.

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At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the process of obtaining user input in the detection of face candidate regions, as taught by Simon, with the method disclosed by Kee.

The suggestion/motivation for doing so would have been to provide the ability for user adjustment of the detected face region (*Simon, paragraph 49*).

Therefore, it would have been obvious to combine Kee with Simon to obtain the invention as specified in claim 143.

Double Patenting

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/764274.

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Although the conflicting claims are not identical, they are not patentably distinct from each other because all the limitations of claim 1 in the present application are found in an obvious variation in the limitations of claim 1 of application 10/764274. For example, the addition of the term "automatically" in lines 9 and 12 of claim 1 in the present application is an obvious variation of the same limitations found in claim 1 of application 10/764274.

Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/764336.

Although the conflicting claims are not identical, they are not patentably distinct from each other because all the limitations of claim 1 in the present application are found in an obvious variation in the limitations of claim 1 of application 10/764274. For example, the addition of the term "automatically" in lines 9 and 12 of claim 1 in the present application is an obvious variation of the same limitations found in claim 1 of application 10/764336.

Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/764339.

Although the conflicting claims are not identical, they are not patentably distinct from each other because all the limitations of claim 1 in the present application are found in an obvious variation in the limitations of claim 1 of application 10/764274. For example, the addition of the term "automatically" in lines 9 and 12 of claim 1 in the present application is an obvious variation of the same limitations found in claim 1 of application 10/764339.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

13. Claims 22-24, 26, 64, 65, 75-77, 79, 112, 113, 134-136 and 138 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2001/0031129 to Tajima discloses a system for face detection.

US 2004/0136574 to Kozakaya et al. discloses a system for face detection.

US 2008/0137919 to Kozakaya et al. discloses a system for face detection.

USPN 6,142,876 to Cumbers discloses a system for face detection.

USPN 6,234,900 to Cumbers discloses a system for face detection.

USPN 6,554,705 to Cumbers discloses a system for face detection.

USPN 6,783,459 to Cumbers discloses a system for face detection.

USPN 6,928,231 to Tajima discloses a system for face detection.

USPN 7,175,528 to Cumbers discloses a system for face detection.

USPN 7,187,786 to Kee discloses a system for face detection.

USPN 7,324,670 to Kozakaya et al. discloses a system for face detection.

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USPN 7,357,717 to Cumbers discloses a system for face detection.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to AARON W. CARTER whose telephone number is (571)272-7445. The examiner can normally be reached on 8am - 4:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron W Carter/
Primary Examiner, Art Unit 2624